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MEDICAL NEWS LETTER

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TABLE OF CONTENTS

MEDICAL NEWS LETTER

Policy

The U. S. Navy Medical News Letter is basically an official Medical Department publication inviting the attention of officers of the Medical Department of the Regular Navy and Naval Reserve to timely up-to-date items of official and professional interest relative to medicine, dentistry, and allied sciences. The amount of information used is only that necessary to inform adequately officers of the Medical Department of the existence and source of such information. The items used are neither intended to be, nor are they, susceptible to use by any officer as a substitute for any item or article in its original form. All readers of the News Letter are urged to obtain the original of those items of particular interest to the individual.

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Tumors of the Hand

Tumors of the hand are many and varied and present interesting problems in diagnosis and management. Some tumors such as ganglia are frequently seen in the hand, while others such as sebaceous cysts are rarely seen. Certain tumors show a peculiar tendency to develop predominantly in the hand. These include glomus tumors, implantation cysts, ganglia, and the isolated xanthomas of tendon sheaths.

The etiology of most tumors of the hand is not clear. Heredity, disturbances in metabolism, and trauma have been cited as significant factors. It is generally agreed that surgical removal is the preferred treatment and often necessitates skin graft replacement. Biopsies should always be of the excisional type.

This report reviews the experience in management of 437 tumors of the hand seen during 10 years, 1940 - 1950. As anticipated, the vast majority were benign. Ganglia were most common (33%), and malignancies next most common (24%). Inclusion cysts, giant cell tumors, and angiomas occurred in one-fifth; the remaining one-fifth consisted of tumors less commonly seen—fibromas, papillomas, mucus cysts, chondromas, lipomas, and melanomas.

Tumors Arising from Skin

Sebaceous Cysts. This lesion occurred only once in the authors' series. These cysts are of interest because of their rarity and because they must be differentiated from other more common lesions, such as inclusion cysts, ganglia, and other subcutaneous tumors over which the skin is freely movable. Sebaceous cysts develop only on the dorsal aspects of the hands and are adherent to their site of origin. Complete excision should result in cure.

Epidermoid Cysts. One of the more common tumors of the hand, this lesion occurred 37 times in the series. In more than 50% of cases, history of trauma was elicited with the cyst gradually appearing after a latent period. The theory that epidermoid cysts may develop from the subcutaneous implantation of epithelial elements by trauma is now generally accepted.

Inclusion cysts usually produce no symptoms. They occur particularly on the palm and volar aspects of the digits, and often in amputation stumps as firm elastic rounded tumors lying free in the subcutaneous tissues. The free mobility of the skin overlying the cyst and the lack of attachment to deep structures assist in differentiating inclusion cysts from sebaceous cysts, ganglia, xanthomas, and other deeply attached tumors of the hand. Surgical removal offers excellent prognosis for cure.

Mucus Cysts. Synovial or mucus cysts occur on the dorsum of the distal phalanges at or near the sides of the base of the nail as flat broad superficial cysts resembling ganglia. The vast majority are seen in adult females, and the middle finger is involved predominantly. In this study, 7 such tumors

were encountered. The fact that mucus cysts recur promptly after removal, unless the overlying skin and cyst are excised together, would indicate that these cysts originate from the lower layers of the corium. Successful treatment depends upon total removal of the cyst and the overlying skin, closing the defect with a small skin graft.

Carcinoma. This lesion is by far the most frequently occurring malignancy of the hand. It occurred 104 times in the series and comprised 90% of all malignancies. It is usually seen on the backs of the hands in men in the older age group. The squamous cell variety occurred more frequently in this series than the basal cell type—approximately 6: 1. A history of chronic irritation or trauma is elicited from 40 to 80% of such patients. Exposure to sunlight and weather is probably the most frequent of the irritating factors.

In appearance, squamous cell carcinomas may vary from that of an unhealed fissure or crack to that of a well developed tumor. Most are superficial and of low-grade malignancy. The treatment of choice consists of early and wide resection with or without skin grafting, following which observation must be made for at least 2 to 3 years. Regional node dissection is indicated in all patients demonstrating enlarged lymph nodes, as metastases may be expected in 50% of such patients. In the authors' experience, the 5-year survival rate was 48%.

Melanoma. Melanomas of the hand occurred 5 times; a definite history of trauma was present in two. Because infection occurs early in subungual melanomas, the true nature of melanoma is often not recognized at the onset and the lesion is mistakenly treated as a chronic paronychia. Clinically, pain is not a prominent symptom. Treatment consists of early and radical excision, and node dissection when indicated. Forequarter amputations are extremely mutilating; thus far, they have offered little more in regard to prognosis than less extensive procedures.

From a prophylactic standpoint, it is important to point out that melanomas develop from junctional nevi in at least 65% of cases. Although the prognosis for subungual melanoma is considered more favorable than for melanoma elsewhere, one series reports a survival rate of only 18.5%.

Tumors of Fibrous Tissue Origin

Ganglia. The most common of tumors of the hand, this lesion occurred 146 times. It is found more frequently in women and affects both hands about equally. A history of injury is obtained in approximately one-third of cases. The etiology is not clear.

Ganglia are seen most frequently on the dorsum of the wrist where they originate from the capsule of the intercarpal joints and the extensor sheaths. The second most common site is the volar wrist in the region of the flexor carpi radialis tendon where ganglia develop from the underlying joint capsule

and the fibrous sheath of this tendon. Ganglia also occur quite typically in the distal palm and on the volar aspects of the proximal phalanges where they arise from the fibrous sheaths of flexor tendons.

Clinically, ganglia appear as single, multiple, unilocular or multilocular, encapsulated cysts containing a thick clear gelatinous fluid. They are characteristically attached to the underlying site of origin on joint capsules, tendon sheaths, or ligaments. Aching pain, weakness, and impaired use of the hand are not unusual complaints and may actually precede the appearance of ganglia.

The highest percentage of cures can be obtained only by complete surgical excision which, in this series, gave a recurrence rate of 12%. Aspiration of the cysts followed by injection of hydrocortisone is not recommended.

Giant Cell Tumors. The origin of these lesions is not clear; they are probably synovial tumors arising from tendon sheaths or joint capsules. A history of trauma is elicited in about half of the cases. The lesion occurs most commonly on the flexor surfaces of the digits in middle aged individuals as asymptomatic, isolated, multinodular tumors which are firm elastic and non-tender. The skin is freely movable over the tumors, but they are firmly attached at their base. The tumor may also involve tendons, joints, and bone. Treatment consists of complete surgical removal including its attached base. The tumor, although benign, was found to recur in approximately 16% of the cases studied because of incomplete removal.

Fibroma. Fibroma—considered rare—was encountered 18 times in this series. The tumor may arise superficially from the skin, subcutaneous tissues, nailbeds, or deeply from such structures as tendon sheaths, joint capsules, ligaments, periosteum and, rarely, from tendons. Clinically, fibromas usually develop insidiously. They may be freely movable or fixed in position and are usually asymptomatic. Complete surgical removal should effect a cure. Recurrence of an apparently benign fibroma should suggest the possibility of sarcomatous degeneration.

Fibrosarcoma. This is a rare lesion (3 in this series) and may present as a deep swelling, but usually arises superficially as a hard, fixed, painful tumor, often reaching large size with a tendency to invade the skin and neighboring tissues. Metastasis occurs early. Once fibrosarcoma is established, radical excision or amputation offers the best chance for cure. The tumors are resistant to radiation.

Lipomas. These lesions occur most frequently on the volar aspects of fingers or palms as soft, well encapsulated tumors. Diagnosis is suggested by the presence of a soft, pseudofluctuant, encapsulated tumor which has grown slowly without symptoms over a period of months or years. The application of an ice bag over the tumor may be an aid in diagnosis as the lipoma hardens when the fat becomes chilled. Treatment consists of surgical removal, and in the case of certain deep lipomas, may require an extensive and difficult dissection.

Tumors of Nerves

In this study, only 8 tumors arose from peripheral nerves of the hand: 4 neurofibromas, 3 plexiform neuromas, and one neurofibrosarcoma. Neurofibromas are only moderately movable under the skin and characteristically arise close to flexion creases as smooth encapsulated asymptomatic tumors. In this study, one of the plexiform neuromas characterized by a diffuse thickening of the median nerve and its branches was encountered in a boy of 7 years of age. Neurofibrosarcoma was encountered in one patient as a small hard flat asymptomatic nodule located in the skin and subcutaneous tissue of the dorsum of the hand. Multiple neurofibromatosis of the hands associated with generalized cutaneous neurofibromatosis was not seen in this series.

Tumors of Blood Vessels

Tumors arising from the vascular tree are not uncommon in the hand and manifest themselves in a wide variety of forms ranging from simple telangiectases to diffuse and progressive arteriovenous or racemose aneurysms.

Hemangiomas. These lesions, according to the classification of Blackfield, are divided into two types—those that will undergo involution and those that will not. The involuting or infantile type includes superficial hemangiomas (capillary and strawberry), the deep hemangiomas (cavernous), and the combined superficial and deep hemangiomas (capillary and cavernous). Hemangiomas of the involuting type are seen in infancy and early childhood and usually date back to birth. Complete involution can be anticipated in this group by the age of 6 years with treatment limited entirely to conservative measures.

The adult forms of hemangioma include port wine stains, true cavernous hemangiomas, venous racemose aneurysms, and arteriovenous fistulas which do not involute spontaneously and may require specific measures in therapy.

In treatment of hemangiomas of the non-involuting type, surgical removal is preferred. Cavernous hemangiomas showing growth, as well as large and deforming ones, should be excised. However, cavernous hemangiomas are often so extensive that complete surgical removal is impossible. Partial excision in one or more stages may be of benefit, utilizing skin grafts as necessary. Treatment of venous racemose aneurysms, arteriovenous fistulas, and hemangiomatosis present formidable problems in surgery of the hand.

Traumatic Aneurysm. In such injuries, the hematoma which develops becomes surrounded with fibrous tissue to form a false aneurysm manifesting itself days or weeks after the original trauma as a soft, compressible, bluish, pulsating, grape-like tumor. Pain and tenderness are usually present if thrombosis has occurred. Excision of the aneurysm and ligation of communicating vessels may be expected to result in cure.

Glomus Tumor. This tumor, developing from the neuromyoarterial glomus, is rare. Its etiology is unknown, although trauma may be a factor. Clinically, glomus tumors develop insidiously and grow slowly as small painful nodules. The diagnosis should be suggested by the key symptom of pain which is usually severe and paroxysmal; usually triggered by pressure upon the tumor or by changes in temperature causing sharp lancinating pain to radiate up the extremity; and usually occurs subungually. Treatment consists of complete surgical removal.

Pyogenic Granuloma. These lesions are considered by some to be true angiomas and by others to be simply heaped up masses of granulation tissue of infectious origin. A history of trauma or infection usually precedes development of the lesion. Treatment consists of surgical excision of the tumor so as to include its vascular base, followed by suture of the small elliptical skin wound.

Tumors of Bone

Chondromas. With the possible exception of chondromas, tumors of the bones of the hand are quite rare. In the authors' series, these lesions were found chiefly in the younger age group. Enchondromas, bone cysts, and the rarely seen giant cell tumors of bone present a somewhat similar appearance clinically and radiologically. Treatment consists of surgical removal followed by thorough curettement of the remaining cavity. Packing of the cavity with bone chips may be necessary; excised segments of the bone shaft should be replaced immediately with bone graft.

Osteoid Osteoma. This lesion is rare and occurred once in this series. The chief symptom is chronic nagging nocturnal pain which is characteristically relieved by small doses of aspirin. The distinguishing feature of osteoid osteoma on roentgenographic examination is the radiolucent central area surrounded by cortical thickening. Treatment requires surgical removal of the tumor, taking care to curette all of the central nidus of osteoid tissue to prevent recurrence. This tumor runs a natural course over a period of several years and eventually cures itself.

Others. Exostoses, myxomas, fibromas, hemangiomas, and Ewing's tumor may occur in the bones of the hand. Bone sarcomas are extremely rare and the prognosis is poor; treatment consists of amputation.
(E. D. Butler, et al, Tumors of the Hand - A Ten-Year Survey and Report of 437 Cases: Amer J Surg, 100: 293-302, August 1960)

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"What is the anatomical site of the trouble?" and "What is its pathological nature?" A correct reply to either question will go a long way to answering the other, for each organ or tissue has its own diseases, and each type of disease has certain sites of election.—Ogilvie

Needle Biopsy for Diagnosis of Breast Carcinoma

Silverman needle biopsy of the breast has proved to be a simple and effective method of obtaining a positive histologic diagnosis of carcinoma under certain conditions. This method has been used with considerable success by the author in a series of 160 breast lesions. Of this number, 86% eventually proved to be carcinoma.

Because it does not require elaborate procedure or entail the slight anesthetic risk of formal surgical biopsy, it can be carried out in the office or clinic, and when the patient is admitted to the hospital for definitive treatment, the histologic diagnosis has been established. Similarly, a patient might be more readily willing to undergo a needle biopsy than an incisional biopsy, and biopsy might be accomplished earlier in the course of the disease.

While modern anesthesia has made surgery possible even for the "poor risk" patient, a saving of anesthesia time can only be to the benefit of the patient. Frozen section, even when most skillfully made, requires an interval of time to accomplish. If the histologic diagnosis can be established conveniently prior to surgery, all anesthesia time can be saved.

The Silverman needle biopsy is considered less traumatizing to the tumor than incisional biopsy. As a corollary to this, the needle biopsy should be performed as atraumatically as possible by one experienced in this technique; multiple "stabs" at the tumor should be avoided. There will be less spillage of tumor-contaminated blood and tissue fluid with a needle biopsy performed prior to operation than with incisional biopsy and frozen section. All of these factors should lessen the risk of implantation and metastasis. The needle biopsy is of extreme value after patients have been treated by nonsurgical means (irradiation, hormones, and others). Some authors are also of the opinion that the chance of infection is less with needle biopsy than with incisional biopsy. Others believe that there is less scarring after a needle biopsy; hence, less confusion in later operative or radiologic procedures.

Needle biopsy is not without its drawbacks. Implantation of tumor along the needle tract is a possibility. In this respect, the needle biopsy should be so planned that the entire needle tract will be excised with the radical mastectomy specimen if the patient is to be treated by operation.

Possible dissemination of the tumor by the needle biopsy is another frequent objection to this technique, although recent work has shown that no risk of this can be demonstrated.

Needle biopsy is of less value in small lesions of the breast. If the needle biopsy does not show carcinoma in a lesion which, clinically, is thought to be a possible carcinoma, surgical biopsy should be performed. In no case, should any delay in therapy be ascribed to a false negative needle biopsy. (Saltzstein, S. L., Histologic Diagnosis of Breast Carcinoma with the Silverman Needle Biopsy: Surgery, 48: 366-374, August 1960)

Preoperative Evaluation by Tilt Table

The problem of hypotension in the chronically ill patient during induction of anesthesia or during an operative procedure has been observed with surprising frequency and can present a distressing or even fatal complication. The basic cause of this problem is not always apparent, although in the absence of heart failure or vasodilating drugs this phenomenon is most often due to a diminished circulating blood volume which may be present in spite of a normal hematocrit.

Tilt table testing was chosen by the authors as a potentially simple method of detecting those patients more susceptible to operative hypotension. It was postulated that tilt table results might correlate well with diminished blood volumes and, in particular, might indicate those patients with deficient postural reflex adjustments. It has been suspected that inadequate reflex mechanisms may develop in patients with long-standing disease processes and limited activity.

In a group of 77 patients studied by the authors, blood volumes were uniformly low. In 47.6%, the blood volume was found decreased by greater than 15% in spite of hematocrit readings well within the normal range. This was true even though none was cachectic or malnourished. Of 23 patients with abnormal responses in the series, 18 had a blood volume deficit of 20% or more. Most patients appeared able to compensate for anything less than this deficit. Eight of these patients had repeat tilt tests after restoration of the blood volume to normal—all showed a subsequent normal response. Of 5 patients with normal blood volumes and an abnormal tilt table test, 2 had extensive, long-standing disease; one had marked adrenal insufficiency.

Ten patients with a normal tilt test were subsequently found to have a blood volume deficit of 20% or more. Four of these patients subsequently demonstrated marked hypotension after induction of anesthesia. Three of the 4 successfully underwent operations later after whole blood transfusions.

In the absence of some obvious cause, such as heart failure, pregnancy, mitral stenosis, or vasodilating drugs, the authors consider that operative hypotension is most often due to diminished circulating blood volume. Within the past few years, adrenal insufficiency has been an occasionally reported cause of operative hypotension. This seemingly reflects the increased use of adrenal steroid drugs.

The difference in response to tilting in the aged has been reported as slight but definite. In the aged, both the systolic and diastolic pressures usually fall, whereas in younger patients, the diastolic pressure usually rises slightly. In addition, the pulse rate is found to accelerate less in the older group.

Part of the response to tilting, such as cardiac acceleration and increased peripheral resistance, is due to an immediate outpouring of norepinephrine, demonstrable in plasma levels more than double the control

values. This fact may explain the instantaneous adjustment necessary to maintain relatively normal hemodynamics after assumption of the tilted posture; certainly, this mechanism must be most important for the prolonged adjustment as more and more fluid pools in the lower extremities. Interestingly, it has been found that patients with essential hypertension have a normal cardiovascular response on tilting, but do not show the expected increase in circulating norepinephrine. If, as is postulated by Hardy and co-workers, norepinephrine is secreted primarily from peripheral neural ganglia rather than from the adrenals, the tilt response of adrenal deficient patients would be anticipated to be normal, as was found in the present studies.

It is significant that only one death was related to 89 operative procedures on 68 patients of this study group. (T. V. Stanley Jr, W. R. Webb, Preoperative Evaluation of the Chronically Ill Surgical Patient by Tilt Table and Adrenal Responses Correlated with Blood Volumes: Surg Gynec & Obstet, 111: 163-169, August 1960)

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Pathologic Physiology of Angina Pectoris and Acute Myocardial Infarction

The distress of pain of angina pectoris and acute myocardial infarction is consequent to ischemia. In angina pectoris, ischemia is transitory; in acute myocardial infarction, ischemia is prolonged and leads to irreversible changes of necrosis. The actual stimulus at the nerve end organs that give rise to the pain has not been identified with certainty. It has certain characteristics in common with lactic acid: it is acid, is destroyed by alkali and by oxidation, and develops most rapidly under oxygen deprivation and carbon dioxide accumulation. The predisposing cause of these two conditions is coronary obstruction; atherosclerosis is the most prevalent lesion, syphilitic aortitis is next in frequency. Various factors influence the degree of ischemia.

Anatomic Pattern of Coronary Arteries. The three main coronary arterial branches—right, left anterior descending, and left circumflex—vary from heart to heart in the relative size of the area they supply. Schlesinger classified hearts in three groups according to the anatomic distribution of these three arteries. Group I (50%): the right coronary artery predominated in the blood supply of the heart, nourishing the right ventricle and a large part of the posterior wall of the left ventricle. Group II (33%): the coronary artery blood supply was balanced between the right and left coronary arteries. Group III (17%): the left coronary artery predominated and supplied more than the entire left ventricle and interventricular septum. Of the various degrees of preponderance of the left coronary artery, the least marked form is that in which the right coronary artery and the left circumflex coronary artery extend to the crux of the heart, and both terminate in parallel posterior descending

branches. In other hearts, the terminal branch of the left circumflex coronary artery constitutes the sole posterior descending coronary artery.

There is no great sex difference in distribution of the groups, although women evidently have a somewhat disproportionately large number of the balanced Group II hearts.

The degree to which these anatomic groups are hereditary and may be responsible for familial tendencies to myocardial infarction and angina pectoris is unknown.

Another variation in local anatomy of the coronary arteries that may significantly influence the effects of coronary occlusion is the presence or absence of a coronary artery to the area of the conus arteriosus.

The presence of a large third division of the left coronary artery was described in the Bantu and suggested by Brink as an explanation for the low incidence of angina pectoris and myocardial infarction in that race.

Pathologic Characteristics of Coronary Arteriosclerosis. Coronary artery occlusions are limited to the three main coronary arteries and their primary branches, and are almost entirely epicardial. The highest incidence of occlusions is not directly at the mouth of the vessel, but a short distance distal to the mouth. Fibrosis and calcification may involve not only the intima but also the entire media. Occlusions in affected hearts tend to be multiple.

Atherosclerotic narrowing or occlusion of a coronary artery may be caused by an atheroma with progressive fibrosis, a superimposed thrombus, intramural hemorrhage in an atheroma, or rupture of an atheromatous abscess. In 6800 consecutive autopsies of patients with coronary artery occlusion, 92% were due to local arteriosclerosis; the remainder were due to embolism, inflammation, and syphilis.

The arteries are metabolically active structures that may be altered even in the absence of atherosclerosis. They participate, as do other tissues in the aging process, in loss of elastic fibers. These changes are most rapid in the left anterior descending artery and slowest in the right coronary artery. Fibroelastic changes occur in the intima and media, atrophy of the smooth muscle is seen in the media, and irregular patches of connective tissue develop.

Comparison of Blood Supply. The circulation of the heart presents many interesting differences from the rest of the body. Skeletal muscle on vigorous contraction can increase its oxygen consumption 30 or more times. This vastly increased requirement is met in part by an increase in arterial and capillary blood flow and in part by greater extraction of oxygen from each unit of blood passing through the capillaries. This ability to borrow on the "reserve" oxygen is not enjoyed by the heart; the heart must "pay as it goes" by increasing the coronary arterial blood flow proportionately when the myocardium needs more oxygen to do more work. Skeletal muscle is also different in that it can continue to contract during exercise, even if the

oxygen supply is momentarily inadequate, by incurring an oxygen debt which is repaid later during rest. The myocardium cannot do this; it depends for its contractility on the oxygen immediately available in the coronary blood. It ceases to contract when it has incurred only one-fifth the oxygen debt skeletal muscle can endure.

Skeletal and cardiac muscle also present an interesting difference in their vascular supply. The smaller arteries and arterioles of striated muscle communicate freely with each other by large anastomotic vessels. The coronary arteries are end arteries in a physiologic or functional sense. The connections that normally exist among the coronary arteries are only fine communications. These communications are not sufficient to prevent infarction of the myocardium when coronary arteries are suddenly occluded by thrombi or emboli.

Therefore, anatomic patency of the coronary arteries is of cardinal importance in maintenance of normal cardiac nutrition and performance; any significant increase in oxygen need by the heart must be met by an increase in coronary blood flow. Failure to meet demands of the myocardium as a whole may lead to congestive heart failure; ischemia of certain areas may lead to cardiac pain or disturbances of impulse formation and conduction; if ischemia is sustained, actual injury or necrosis of heart muscle may develop.

Effect of Acute Coronary Occlusion. When a coronary artery is suddenly and completely occluded, a myocardial infarct is usually produced. The size of the infarct, however, is always less than the total territory supplied by the artery because of some intercoronary connections.

Within a minute following acute occlusion, myocardial contraction diminishes progressively as ischemia continues. As the contractions become feeble, they are balanced by the intraventricular pressure, and the ischemic area expands paradoxically with each systole. Data indicate that the heart may recover without structural damage if the duration and degree of ischemia are not too great. Experimentally, it has been learned that occlusion of the main stem of a coronary artery for 40 minutes generally produces areas of irreversible damage and necrosis. At any time during or after occlusion, ventricular fibrillation or other arrhythmias may appear. Their development may well be related to differences in the gradient of oxygen potential.

Effect of Gradual Coronary Occlusion. In human hearts with old occlusions, intercoronary collateral channels of a size greater than seen in the normal heart were observed in practically 100% of cases. This anastomotic circulation evidently develops as a compensatory phenomenon in relation to marked arterial narrowing or occlusion.

The hearts of patients with angina pectoris may show one or more occlusions in two or even three main stems, a rich collateral development, and only scattered myocardial fibrosis. While there is a general relationship between the incidence of coronary occlusion and occurrence of angina pectoris,

other mofidying factors are also of great importance, such as the exact site of the occlusion, the importance of the vessel involved, the adequacy of the collateral circulation, the rate at which such occlusions or narrowings develop, and the temporary influence of emotion, exertion, and vasomotor reflexes. Although damage to the heart is minimized by development of the collateral circulation, the margin of safety, "the coronary reserve," is reduced.

Augmentation of Coronary Blood Flow. Augmentation of the coronary collateral circulation, beyond that which occurs naturally following marked coronary narrowing or complete obstruction, is limited inevitably because the extent of the natural development appears to be well nigh maximal and marked in the area where it is most effective. Vasodilator drugs have not been demonstrated to accelerate the rate of development or augment the extent of intercoronary anastomoses. In grossly normal hearts from anemic patients, the incidence of anastomoses was 39%, compared to 9% in grossly normal hearts from nonanemic patients. Anemia may conceivably have some therapeutic application in the treatment of coronary artery disease, but its application seems hazardous and, to date, its use has not been feasible.

Augmentation of the coronary collateral circulation after a program of exercise has been observed experimentally. Although the clinical implications are important, they do not afford a therapeutic approach of major proportions. It is a plausible assumption that relative anoxia is the factor that stimulates formation of the collateral circulation incident to coronary obstruction, anemia, exercise, cardiac hypertrophy, and cor pulmonale.

Vasomotor Control of Coronary Circulation. "Spasm" of the coronary arteries with diminished blood flow has also been invoked frequently to explain precipitation of episodes of angina pectoris. Spasm could result from a direct effect of epinephrine or other circulating substances on the smooth muscle of the arteries, or could be induced by vasomotor reflex impulses. Reflex coronary vasomotor spasm may be important in increasing the extent of myocardial necrosis and mortality following acute coronary artery occlusion.

Existence of vasomotor effects that reduce coronary flow is in no way incompatible with demonstration and importance of widespread pathologic changes in the hearts of patients with angina pectoris. The primary etiologic factors of coronary obstruction, valvular disease, and arterial hypertension are not to be considered the exclusive cause of cardiac pain; rather they constitute the stage upon which various transitory precipitating factors may operate. Thus, coronary vasoconstriction, anemia, tachycardia, fever, hypermetabolism, or hypotension may act as precipitating agents in production of pain in a patient whose coronary circulation is already compromised by arterial obstruction. In the absence of an adequate pathologic substrate, these factors rarely, if ever, are sufficient in themselves to produce angina pectoris. (H. L. Blumgart, P. M. Zoll, Pathologic Physiology of Angina Pectoris and Acute Myocardial Infarction: Circulation, XXII: 301-307, August 1960)

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Punch Biopsy of Synovium

In commenting some years ago upon pathologic examination of the human joint, Hench compared this structure to an inviolate "sacred cow," and noted the infrequency of the study of joint tissue at otherwise extensive postmortem examination. There has been a paucity of information concerning the appearance of the synovium in almost all except the more common forms of rheumatic disease. This deficiency has been only partially offset by use of open joint biopsy which imposes limitations of technique. In recent years, development of a closed biopsy procedure utilizing the punch instrument has made it possible to obtain synovial tissue with relative ease. The authors report 142 consecutive punch biopsies of synovium taken from 136 patients, usually obtained from the suprapatellar bursa. Correlations of the histologic appearance of the biopsy specimens were made with established clinical diagnoses.

Rheumatoid Arthritis. Examination of the biopsy specimens disclosed pronounced histologic changes in the synovium in rheumatoid arthritis which could be correlated with the presence of clinically active joint disease.

In 26 patients with active involvement of the knee, there were changes in the biopsy specimens of 7 in the category of questionable rheumatoid arthritis; 17 showed unequivocal rheumatoid changes. Of 6 patients with inactive disease, only 2 showed even as much as questionable changes; the others showed no disease or nonspecific synovitis. Four cases had active rheumatoid arthritis of joints other than the knee; 2 showed questionable changes, one showed nonspecific synovitis and the other exhibited no disease.

The chief problem in this disease, from the standpoint of tissue diagnosis, is that the changes seen are not specific for rheumatoid arthritis.

Systemic Lupus Erythematosus. Fourteen patients had a clinical diagnosis of systemic lupus erythematosis (11 established, 3 suspected) with a history of current or remote involvement of the joints. No histologic changes were encountered which were considered specific for the synovium in systemic lupus erythematosus. Neither fibrin nor fibrinoid was seen with greater frequency than in rheumatoid arthritis, nor was consistent absence of inflammatory cells, as described by Bennett and Dallenbach, found. The authors agree with those who believe that synovial changes in systemic lupus erythematosus either are nonspecific or resemble those seen in rheumatoid arthritis.

Progressive Systemic Sclerosis. In 7 patients, the diagnosis of progressive systemic sclerosis was established on the basis of clinical findings and histologic examination of the skin. Of this group, one was found to have histologically normal synovium, one slight atrophy not differing significantly from that seen in normals, while 5 were discovered to have a distinctive abnormality which was considered to be highly suggestive, if not pathognomonic, of this disease.

Gout. The diagnosis of gout appeared to be well substantiated in 18 patients in this series. Among 21 synovial biopsy specimens taken, 8 contained

tophaceous matter. In only one instance was a patient with extra-articular tophi found to be lacking in urate-laden joints. In 8 instances, the knee was acutely inflamed at the time of biopsy. Three showed changes of questionable rheumatoid arthritis. The lack of histologically discernible tophaceous matter in the synovium of the remaining members of this group and in the majority of patients with acute gouty geniculitis at the time of biopsy suggests that urate deposits per se play little if any role in development of acute gout.

Miscellaneous Disease. In a group with rheumatic fever, only one of 6 patients showed clinical evidence of active inflammation of the knee joint at the time of biopsy; in this case, the findings were those of acute nonspecific synovitis. None of the more distinctive features of rheumatoid arthritis were observed. Two of the 3 specimens from patients with neuropathic arthropathy (Charcot's joints) presented histologic changes considered to be characteristic of this disorder. One of 3 biopsy specimens from cases of psoriatic arthritis was placed in the category of rheumatoid arthritis, another in the questionable rheumatoid arthritis group. These observations are in accord with others who believe the histologic findings in the synovium of psoriatic arthritis are indistinguishable from those encountered in rheumatoid arthritis. In one of 3 cases of hemochromatosis, there were deposits of finely particulate iron-containing pigment confined to the surface lining cells, a finding considered to be useful in differentiation of this form of hemosiderosis from that encountered as a result of hemarthrosis. There was no consistent histologic pattern in the 4 biopsy specimens from patients with degenerative joint disease (osteoarthritis) or any of the other miscellaneous categories.

Conclusions. While characteristic pathologic changes were encountered in a majority of patients with active rheumatoid arthritis, these did not prove to be specific, being noted as well in cases of systemic lupus erythematosus and psoriatic arthritis. Changes seen in a number of patients with progressive systemic sclerosis did appear to be pathognomonic of this disease; those seen in gout were not helpful in a high percentage of cases. In all, punch biopsy of the synovium has proved to be a simple, safe, and practical procedure which may supply information of considerable value in the study and diagnosis of joint disease. (G. P. Rodnan, J. Yunis, R. S. Totten, Experience with Punch Biopsy of Synovium in the Study of Joint Disease: Ann Intern Med, 53: 319-331, August 1960)

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Great men and insignificant men have like accidents, like vexations, and like passions; but the former are on the outside of the wheel, and the latter near the center, and are therefore less agitated by the same movements.

—Pascal

Navy Motor Vehicle Accident Toll Declines in 1959

Although the toll of motor vehicle accidents among Navy and Marine Corps personnel in 1959 was a tragic one, it represents an improvement over recent years, and suggests that the intensive program to promote driving safety among naval personnel has achieved a considerable measure of success.

Motor Vehicle Accident Indices - Navy and Marine Corps 1950-59

	Rate Per 100,000				
Year	Admission	Noneffective	Death	Sick Days Per Case	Fatality Ratio*
1950	1,009.1	118.6	75.4	43	7.5
1951	867.7	100.4	65.9	42	7.6
1952	806.4	101.6	65.2	46	8.2
1953	806.7	95.3	59.9	43	7.4
1954	785.8	94.6	52.7	44	6.7
1955	879.2	98.9	67.9	41	7.7
1956	883.1	101.7	71.5	42	8.1
1957	789.8	97.1	64.8	45	8.2
1958	777.9	89.0	67.2	42	8.6
1959	690.2	75.9	61.8	40	9.0

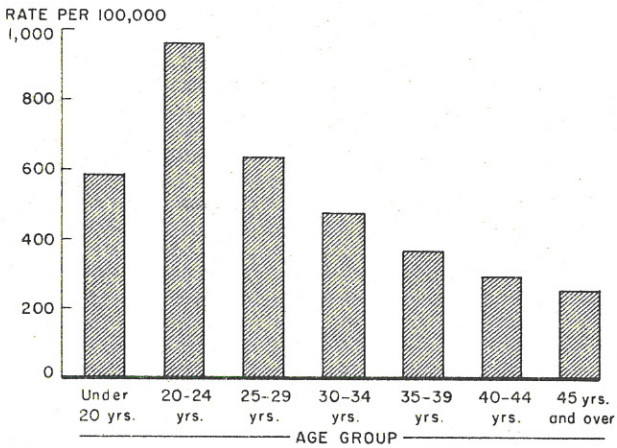
* Deaths per 100 injured

During 1959, motor vehicle accidents took 510 lives and hospitalized 5696 Navy and Marine Corps personnel. They accounted for 37% of all deaths, 7% of the sick days accumulated during the year, and 4% of the admissions to the sicklist. Manpower losses from these accidents showed decided reductions from those of a decade ago and a substantial decline from 1958. The admission rate was the lowest of the 50's and the death rate the lowest since 1954. The average daily manpower loss resulting from personnel being on the sicklist for treatment of injuries sustained in motor vehicle accidents was also the lowest of the 10 years. This decline in noneffectiveness was a reflection of a shorter average stay for those who were admitted as well as of the reduction in the admission rate. In comparison with losses at the beginning of the decade, the 1959 experience shows a savings of approximately 130,000 man-days—an average of a little better than 350 more men on duty each day of the year.

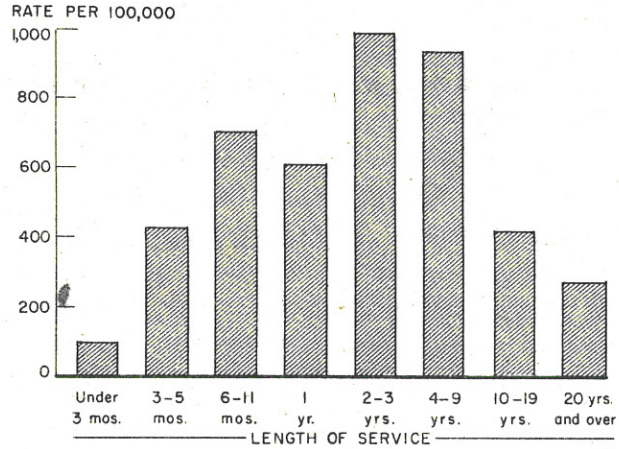
The improved motor vehicle accident picture was shared by both branches of the naval service. The Marine Corps made the greater improvement over 1958, but continued to have higher rates than the Navy. Both officer and enlisted personnel participated in the Marine Corps reduction, while in the Navy, enlisted personnel were responsible for the reduction.

The most substantial improvement over the 1958 record was among personnel in the United States. Outstanding were the 32% decrease in admission rate of the 9th Naval District, 66% decline in death rate of the 3rd Naval District, and 55% dip in death rate of the Potomac and Severn River Naval Commands. Increases were reflected in both admission and death rates of the 4th Naval District, Hawaii, and Alaska. Three Districts—1st, 6th, and 13th—had higher death rates, although their admission rates declined.

Motor-vehicle-injury admissions most frequent among personnel 20 - 24 years of age



Motor-vehicle-injury admission rate highest for personnel with 2 - 3 years of service



During 1959, as in other years, the greatest number of admissions and deaths from motor vehicle accidents occurred during the weekend period, Saturday and Sunday. The fewest admissions were on Wednesdays; however, a relatively high fatality ratio for this day was indicative of the severity of these midweek accidents. It is a noteworthy fact that not a week passed without a toll of at least two naval lives lost in motor vehicle accidents. The greatest number of deaths in one day occurred on 5 September—Saturday of the Labor Day weekend—when 10 members of the naval service were killed.

In the Marine Corps, personnel stationed at Camp Lejeune and Camp Pendleton had the largest number of automobile accidents. Among Navy activities, there were concentrations at many air stations, the largest occurring in the Jacksonville area. The highest death rates were observed in the 13th, 1st, and 4th Naval Districts, respectively.

As in the past, personnel under 25 years of age accounted for about 75% of the admissions and deaths resulting from motor vehicle accidents. Admission and death rates were higher for personnel of ages 20 through 24 years than for those under 20. After age group 20 - 24, a marked and generally steady decline occurred in both admission and death rates.

In addition to personal suffering, loss of manpower impedes the efficiency of the Navy and Marine Corps. It takes skilled men away from their work and imposes an additional workload on fellow personnel. In terms of dollars and cents alone, the cost to the government runs into thousands of dollars for each injured person and into tens of thousands for each fatality. Analysis of motor vehicle accident admissions and deaths in terms of length of service provides further insight as to the type of manpower losses incurred by the naval service. More than three-fourths of the admissions during 1959 involved personnel with 2 or more years of service. Over 60% of the fatalities were in the same category. These experienced personnel are usually highly trained in some naval specialty and have been making difficult-to-replace contributions to the naval operation.

The Navy and Marine Corps are conducting intensive educational programs in an effort to minimize manpower loss from motor vehicle accidents. The vigorous accident prevention program embraces traffic safety, cooperation with civilian authorities in improved law enforcement, adjustment of leave and liberty schedules, and research directed toward a clearer understanding of the causes of accidents, including psychologic factors in accident susceptibility. Positive action must continue if the gains of 1959 are to be maintained and furthered. In the words of the Surgeon General of the Navy, "We must not rest here. We must redouble our efforts to insure that these gains are lasting ones which will not only extend into future years but will multiply many times over. Each life lost, each person injured, each accident is one too many."

The greatest insurance against the automobile accident is the desire and determination of each and every driver to be a SAFE DRIVER. (Statistics of Navy Medicine, August 1960)

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BUMED INSTRUCTION 6420.1 15 September 1960

Subj: Self-Contained Underwater Breathing Apparatus (SCUBA); hygienic maintenance of

Outbreaks of febrile illness associated with use of underwater swimming apparatus have been documented in several naval activities. The illness appears to be due to inhalation of microorganisms that contaminate the interior of SCUBA gear. This instruction describes cleaning and maintenance procedures required to prevent illness.

BUMED INSTRUCTION 6500.1A 21 September 1960

Subj: Naval Medical and Dental Research; opportunities for officers of the Medical Department

Research is an important function of the Medical Department. Excellent facilities are available for research in basic biologic sciences, clinical medicine, experimental medicine and surgery, dentistry, neuropsychiatry and psychology, clinical and basic aspects of radiobiology, preventive medicine aspects of chemical, biological and atomic warfare, and preventive, tropical, aviation, submarine and field medicine. The Bureau will make every effort to place approved applicants seeking careers in research in appropriate research activities; to this end, applications are invited for duty in research.

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BUPERS INSTRUCTION 1301.26A 26 August 1960

Subj: Utilization of Medical officers assigned to ships and fleet units at shore medical facilities

The number of authorized Medical officers in the Navy versus the continuing need for medical service not only to our fleet personnel but to the shore establishments and dependents, makes it essential that the services of all Medical officers be fully utilized. Toward this end it is necessary to augment medical personnel in the shore establishment with certain Medical officers stationed afloat, on a temporary duty basis. As a further expedient, Medical officers should be relieved of many of their administrative duties.

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From the Note Book

Navy Staff to Leave Tripler Hospital. The Secretary of Defense recently approved a recommendation that Tripler Army Hospital, Oahu, Hawaii, be staffed entirely by the Army. The Navy will phase out its personnel by 30 June 1961, leaving only an administrative liaison unit.

Commandant's Representatives at Medical Schools. A 3-day meeting for Reserve Medical officers who serve as Commandant's Representatives at medical schools in the 9th Naval District was held recently. The officers, representing 14 of 21 schools in the district, were provided with a clearer concept of their duties.

Foreign MO to Study Navy Preventive Medicine. Arrangements have been made for CDR Carl H. Blaas, Medical Corps, Federated German Navy, to take an orientation tour to study certain aspects of preventive medicine as practiced in the U.S. Navy. The German officer is tentatively scheduled to visit the Preventive Medicine Unit No. 2 at Norfolk, Va.; The Vector Control Unit at Jacksonville, Fla.; and the Industrial Hygiene Department at the Philadelphia Naval Shipyard.

Proposed Long Beach Hospital. Planning schematic sketches for the proposed Long Beach Naval Hospital were received and reviewed in the Bureau of Medicine and Surgery recently, in consultation with representatives from the Bureau of Yards and Docks.

Disorientation Studies at NSAM. The National Aeronautics and Space Administration has agreed to fund a project for disorientation studies at the Naval School of Aviation Medicine, Pensacola, Fla. The studies were proposed by CAPT Ashton Graybiel MC USN, Director of Research of the School. This assistance will accelerate the studies by making possible acquisition of much needed equipment and personnel.

CDR Pflag at APA Meeting. CDR S. C. Pflag MSC USN, Head of Hospital Corps Training, and Assistant (for Pharmacy officers) to the Director, Medical Service Corps Division, attended the American Pharmaceutical meeting in Chicago as Chairman of the Military Section. He addressed the Student Section on the practice of pharmacy in the Navy, and reported to the Military Section on the status of pharmacists in the Navy.

Sir Harry Platt Speaks at NNMC. Sir Harry Platt, distinguished British orthopedic surgeon and author, addressed the Medical staff of the National Naval Medical Center, Bethesda, Md., recently on the topic, Malignant Tumors of Bone. He is Emeritus Professor of Orthopedic Surgery at the University of Manchester, England; President of the International Federation of Surgical Colleges; and Past President of the Royal College of Surgeons of England. His visit in the Washington area was part of a nation-wide tour during which he visited major orthopedic centers in the United States. (PIO, NNMC)

Antihypertensive Agents. Conducting a double blind control study of antihypertensive agents at eight VA hospitals, investigators reported that, in mild hypertension, reserpine plus hydralazine was more effective than reserpine alone or placebos. In moderately severe hypertension, the reserpine-hydralazine regimen was considerably more effective than either reserpine alone or placebos, and produced as great a reduction of blood pressure as reserpine plus ganglion blocking drugs. (V.A. Cooperative Study, Arch Intern Med, July 1960)

Malaria Still a Problem in the Americas. Malaria still exists in about 30% of the Americas, The Pan American Health Organization-World Health Organization reported at the 12th annual meeting of the directing council of PAHO in Havana. Malaria is completely eradicated in the United States, Chile, Barbados, Martinique, and Puerto Rico. Other countries have stopped the disease in isolated areas or large sections. Yet, large areas of the Americas are faced with the problem of continuing combat with the disease-carrying mosquito; budgets are in the millions for this purpose. (Science News Letter, 78: 148, September 3, 1960)

Aldosterone and Hypertension. Data obtained by the authors establish that the syndrome of malignant hypertension is usually associated with hypersecretion of aldosterone, apparently due to bilateral adrenal hyperfunction. This activity may prove to be a secondary or concomitant phenomenon. However, the results presented make it reasonable to consider the possibility that hypersecretion of aldosterone plays a causal role in malignant hypertension. (J. Laragh, et al, J Clin Invest, July 1960)

Effect of Physicians' Attitudes on Response to Medication. The attitudes of 40 physicians toward tranquilizing drugs was measured. During a fixed progressive dosage period, patients of physicians with more favorable attitudes showed significantly greater response. However, because of the possible factor of bias in rating the patients' condition, the study needs to be replicated. (D. Haefner, et al, J Nerv Ment Dis, July 1960)

Bone Extract and Bone Healing. The authors observed the effects of intravenous doses of bone extract given to rats at the time of bone fracture. Results indicated that the extract does have a stimulatory effect on the physiologic processes controlling remineralization in a fracture. The time(s) of administration of the extract and the amount given appear to play an important role in the total process. (H. Koenig, et al, Surg Gynec & Obstet, August 1960)

Renacidin for Urinary Calcifications. Use of renacidin as a solvent for urinary calcifications in 45 cases with encouraging results has been made with no toxicity. Several staghorn calculi have been dissolved chemically, presumably for the first time with any rapidity. Its use in treating ureteral, vesical, and renal calculi and with the indwelling catheter is described and the results tabulated. (W. Mulvaney, J Urol, August 1960)

Strangulation Obstruction. Peritoneal fluid resulting from strangulation obstruction is toxic when injected into normal animals; it apparently possesses different characteristics than toxic products of possible associated bacterial infection alone. However, some strong relationship of the strangulation fluid with bacterial infection exists. (W. Barnett, Gastroenterology, July 1960)

DENTAL SECTION

Eye Safety for Dental Officers

For many years it has been apparent to dentists that in some dental operations, especially those in which rotating instruments are used, debris frequently flies out of the mouth. The debris may consist of fragments of teeth and restorative materials, and particles of dust, calculus, or pumice which may be air-borne or carried in droplets of water. If this material flies into the eyes, it may cause mechanical injury or infection or may institute an allergic reaction.

Some dentists have had such debris get into their eyes; those wearing glasses often note debris on their lenses after operative procedures. A number of authorities have advised dentists who do not need prescription lenses to wear glasses with plano lenses for protection. It has been pointed out, however, that much of the material adhering to the glasses would not have entered the eye because of the efficiency of the ocular reflex mechanism.

With introduction of dental instruments with much higher rotating speeds, this hazard has increased for several reasons. First, it is necessary to cool the instrument and the tooth and to lubricate the cutting area to gain maximum efficiency. The agents used are air, air-water spray, or water. Thus, debris-laden air, spray, or water now tends to leave the oral cavity in greater quantities than formerly and some of it in the direction of the dentist's eyes and/or those of his assistant. Second, higher speeds impart greater velocity to materials leaving the oral cavity. Third, due to reduced visibility and increased rapidity of cutting, most operators use direct vision operating. (Visibility is reduced by the spray and constant coverage of the dentist's mirror with fog and debris.) Direct vision operating brings the dentist's eyes closer to the patient's mouth and in more direct line with air-borne or water-borne material. Fourth, occasionally instruments or portions of instruments have come loose or broken off during operations and have been thrown either within or outside the mouth. The following suggestions may be helpful:

Most debris-laden water in the field of operation should be removed with efficient evacuating equipment; this requires an alert competent assistant who follows each step of procedures carefully. Also, glasses with lenses of adequate size should be worn. Officers who do not require corrective lenses can obtain glasses with plano lenses from the dispensary. (CAPT G. W. Ferguson DC USN, U.S. Naval Dental School, NNMC, Bethesda, Md.)

Effectiveness of Some Antiseptics on Oral Mucous Membrane

Preparation of the mucous membrane with an antiseptic before injection of a local anesthetic is an accepted procedure in dentistry. In practice, the dentist swabs the area to be injected, puts down the swab and takes up the syringe with little delay between the actions, so that the antiseptic usually has only from 15 to 30 seconds to act. A limited study was made to test the effectiveness under clinical conditions of various antiseptics.

An area of buccal mucous membrane was rubbed with a sterile swab ("first swab"), the antiseptic was applied, and after 15 to 30 seconds another sterile swab ("second swab") was rubbed over the area. Direct cultures were made from each swab. The first swab showed the microorganisms present in the selected area before treatment. The second swab was moistened with sterile water or broth before use, because some of the antiseptics had a drying effect on the mucous membrane and dry surfaces cannot be sampled satisfactorily with a dry swab. Six antiseptics were tested in 470 patients. Complete inhibition of growth of oral bacteria on blood agar was the standard by which the antiseptics were assessed.

Both tincture of iodine and aqueous iodine solution (iodine 2.0%, potassium iodide 2.0%, plus distilled water) were highly effective in their powers of disinfection. Two percent Hibitane (chlorhexidine 2.0%, plus alcohol) also proved a good disinfectant for use on the oral mucous membrane. Seventy percent alcohol was found to be virtually useless as an antiseptic on the mucous membrane; probably saliva has an inhibitory effect on alcohol. Relatively poor results also were obtained with Dettol (p-chloro-m-xylenol 1.44%) and Roccal (benzalkonium chloride 2%). Metaphen (nitromersol) was the least effective of all the antiseptics tested, and it had no drying effect on the mucous membrane. (R. A. Cawson, I. Corson, Effectiveness of Some Antiseptics on the Oral Mucous Membrane: Brit Dent J, 106: 208-211, March 17, 1959)

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Open Letter to All Navy Dental Personnel

This letter is to express my sincere appreciation to all of you, who on August 22, so wholeheartedly supported the commemoration of the Forty-Eighth Anniversary of the founding of the U. S. Navy Dental Corps. Many excellent reports of your successful affairs have reached this Bureau through copies of ship's and station's publications and civilian newspapers. The articles in these publications were uniformly in good taste and can result only in enhanced public respect for our profession and the Navy. I am confident that the birthday celebrations

contributed significantly to the solidarity and esprit de corps of our organization.

I am happy to report that the ceremonies, receptions, and news articles were so numerous again this year that it is not practicable to send individual letters of appreciation to the heads of dental facilities who sponsored commemorative activities. I am pleased that your enthusiastic support in recognizing the anniversary of our Corps has made it necessary for me to use an open letter to express this "Well Done" to you.

C. W. SCHANTZ
Chief, Dental Division

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Dental Care - Fiscal Year 1960

Several noteworthy changes took place in the amount of dental care rendered by Navy Dental officers During Fiscal Year 1960. Among the changes were those related to care of "Dependents" and "Others" (Army, Air Force, Retired, et cetera). While the overall number of dental procedures performed showed a slight increase (2.1%), the amount of dental care rendered "Dependents" and "Others" showed a much greater increase; 11.7 and 9.3% respectively. Dependent care accounted for approximately 6% of the total number of procedures performed; "Others" accounted for 3.3%.

Procedures	1959	1960
Total	7,285,409	7,439,251
Operative, crown and bridge	2,998,285	3,172,865
Prosthodontics	83,905	82,559
Oral Surgery	387,786	376,223
Periodontics	587,938	625,076
Other (examinations, x-rays, et cetera)	3,227,495	3,182,528

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Institute on Hospital Dental Service

The First Advanced Institute on Hospital Dental Service, conducted by the American Hospital Association in cooperation with the American Dental Association, will be held 29 November through 1 December 1960 at the American Hospital Association Building, Chicago, Ill. The Institute is an outgrowth of basic institutes held over the past 4 years in various cities which presented principles and standards for the administrative and professional organization of dental service in hospitals. The Advanced Institute is intended to present a particular phase of hospital dentistry in relation to the hospital and to the total health care of the patient.

One retirement point may be credited to eligible Reserve Dental officers for attendance at each of the accredited sessions: 29 November—(1) Responsibility of Chief of the Dental Service; (2) Inservice Training Program for Junior Staff Members. 30 November—(1) The Dental Department as a Diagnostic Service for the Hospital (importance of oral tissue in early detection of systemic disease; the role of the clinical pathological conference in dental diagnosis); (2) Orientation for Workship Sessions.

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Personnel and Professional Notes

Navy Dental Exhibit at ADA Session. The Navy Dental Corps' exhibit—Education in Dentistry, U.S. Navy Dental Corps—will be shown at the 101st Annual Session of the American Dental Association, Los Angeles, Calif., 17 - 20 October 1960. The exhibit will depict a wide variety of professional subjects and will be illustrated by color transparencies, representative art, and training aids. The monitor will choose a subject by illuminating a sliding panel, one for each subject, and will then illustrate and supplement his talk with training aids. Monitors will be: CAPT H.J. Towle, U.S. Naval Dental School, and CAPT S.E. Tande, U.S. Naval Training Center, San Diego, Calif.

USS HAMUL Host to Japanese Dental Society. Dental personnel aboard the USS HAMUL recently were hosts to 85 members of the Hyogo Prefecture Dental Society of Kobe, Japan. The guests were welcomed by the Commanding Officer of the ship, CAPT F.W. Silk USN, and then were taken on a tour of the ship with emphasis on the ship's dental facilities. Dr. Hanzo Okuno, President of the Society and Vice President of the Japanese Dental Association, lauded the steps taken in that area toward a better understanding of international dental problems and their solutions. During the professional portion of the meeting, CDR R.C. D'Vincent DC USN discussed Dental Responsibilities and Services in the U.S. Seventh Fleet. Table clinics were presented by LT H.S. Koppelman (USNR), Temporary Acrylic Fixed Bridges; and LT J.W. Schnoor (USNR), Indirect Technique for Gold Inlays.

Obituary. CAPT John A. Hogan DC USN died, after a short illness, at the U.S. Naval Hospital, St. Albans, N.Y., on 27 August 1960. CAPT Hogan was born in Philadelphia, Pa., June 1913, and graduated from Temple University Dental School in 1937. He conducted a private practice in Philadelphia for four years prior to reporting to the Shipyard, Philadelphia, for his first active duty in September 1941. Among the many ships and stations on which CAPT Hogan served were the USS SUMTER, USS MARKAB, and USS PHILIPPINE SEA. Prior to his illness, CAPT Hogan was Head of the Periodontia Department, U.S. Naval Dental Clinic, Brooklyn, N.Y. Interment was in Arlington Cemetery; Dental officers of the Washington, D.C. area were honorary pallbearers. He is survived by his wife, Mrs. Esther Hogan.

CDR Selfridge Commended. CDR G.D. Selfridge DC USN, now on duty at the U.S. Naval Air Station, Norfolk, Va., was recently commended by the Commanding Officer of the USS RANDOLPH for his outstanding performance of duty while attached to that ship. The citation reads:

> "As Dental Officer during the entire competitive year, your devoted performance of duty, foresight, professional skill, and fine leadership contributed measurably to the outstanding teamwork displayed by all departments in winning efficiency awards, and in bringing the battle efficiency pennant to the USS RANDOLPH for the fourth consecutive year."

Eleventh Naval District Postgraduate Course. As part of the professional inservice training program of the 11th Naval District, a short postgraduate course in Periodontics was presented to eligible Dental officers on duty in the district at the U.S. Naval Training Center, San Diego, Calif., 7 - 9 September 1960. Subjects included: histology and histopathology of the periodontium; diagnosis and treatment planning; therapeutic procedures; and equilibration, splinting, and instrument maintenance. Practical demonstrations covered gingivectomy and gingival repositioning. Instructors were LCDRs E.E. Davis and W.N. Johnson.

CAPT Jeansonne Retires. CAPT Edmund E. Jeansonne DC USN was transferred to the Retired List of the Navy on 1 September 1960, after 22 years of active service. CAPT Jeansonne was born in Gretna, La., and graduated from the School of Dentistry, Loyola University, New Orleans, La., in 1938. In August 1938, he accepted a commission as LTJG in the U.S. Navy Dental Corps and reported to the Naval Dental School, Washington, D.C., for duty. Among many assignments, he served on board the USS TUSCALOOSA and the USS HAVEN. CAPT Jeansonne was Assistant to the Head of the Personnel Branch, Dental Division, Bureau of Medicine and Surgery, prior to reporting to his last duty station as Executive Officer, U.S. Naval Dental School, NNMC. CAPT and Mrs. Jeansonne are making their home at 7832 Hampden Lane, Bethesda, Md.

Tooth Contract - Changes of Address. The Dentists' Supply Company of New York has indicated changes in dealers' addresses on open-end tooth contract No. N32 6832. Page 13: California—California Dental Supply Company, 712 E. Colorado Blvd., Pasadena, Calif. Page 15: Oklahoma—Hettinger Dental Supply Company, 607 S. Cheyenne St., Tulsa, Okla.

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Short Postgraduate Course in Oral Surgery

A short postgraduate course in Oral Surgery will be presented at the U.S. Naval Dental School, NNMC, Bethesda, Md., 10 - 14 April 1961. The course will consist of seminars, lectures, and demonstrations which will cover treatment of facial fractures, other oral surgical procedures, local and general anesthesia, premedication, principles of exodontia, and biopsy techniques. Emphasis will be placed on preoperative evaluations for minimal postoperative complications. CAPT D.E. Cooksey, Diplomate, American Board of Oral Surgery, will be the instructor. Quotas have been assigned to the First, Third, Fourth, and Fifth Naval Districts.

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RESERVE SECTION

Components of the Naval Reserve

The Naval Reserve is composed of: (1) Ready Reserve - eligible for pay; (2) Standby Reserve - ineligible for pay; and (3) Retired Reserve - ineligible to participate.

The Ready Reserve contains the Selected Reserve which comprises a force of 135,000 to 155,000 officers and enlisted personnel. They undergo continuous year round training at regularly scheduled weekly drills of 3 hours duration, plus 14 days' active duty for training each year at training centers and aboard ship. This training gives them the knowledge and proficiency required of their rank or rate, designator, or job code. They are the advance guard of specifically trained naval personnel and are available for a national emergency and, immediately on M Day, for general mobilization.

The "A" Group will augment the Regular Fleet, the Reserve Fleet, and advance bases. In addition, Medical officers, Dental officers, and corpsmen

will augment the Fleet Marine Forces. The "B" Group of the Selected Reserve will augment the shore based activities and furnish personnel to the Reserve Fleet as required for coastal defense.

The Standby Reserve comprises that force of the Naval Reserve that is not immediately available for a national emergency or declared war. They may be ordered to active Naval service after M + 3 months. They are divided into Standby I and Standby II Groups. The Standby I are entitled to participate in Naval Reserve training, earn retirement and promotion points, and take training duty, but are not entitled to receive pay. The Standby II are that portion of the Active Status pool who are not participating in the Naval Reserve. They are the deadwood. They normally are disposed of after 3 years of continuous inactivity. They are ineligible for any benefits except continued longevity.

The Retired Reserve are composed of officer and enlisted members on the honorary retired list in pay and non-pay status. They may be ordered to active Naval Service during war, depending on their age and physical condition. The attrition in this group obviously is quite high, in keeping with the age level.

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Two-Week Course in Disease Vector Control

A two-week course in Disease Vector Control will convene on 5 December 1960 at the U. S. Naval Disease Vector Control Center, Naval Air Station, Jacksonville, Fla.

This course consists of series of lectures, demonstrations, and field experience relating to vector and pest prevention and control procedures with special reference to naval preventive medical aspects. The role of insects, other arthropods, and rodents in the disease-vector reservoir host relationships is given careful consideration. Recognition, identification, biology, and habits of the vectors in relation to prevention and control are stressed. The types, procurement, toxicity, safe use, proper choice, and application of pesticides are dealt with. Recent advances and developments are presented.

Officers and chief petty officers should have working khaki uniform in addition to the regular uniform. Enlisted personnel should have at least two sets of dungarees in addition to their regular uniform. On-station billeting and messing facilities are available.

Inactive Naval Reserve Medical Department personnel (including enlisted hospital corpsmen and CEC officers) are eligible to attend. Quotas have been given to the 1st, 3rd, 4th, 5th, 6th, 8th, and 9th Naval Districts.

A similar course, Disease Vector and Eonomic Pest Prevention and Control, will convene on the same date at U. S. Naval Disease Vector Control Center, NAS, Alameda, Calif. Quotas have been given to 11th, 12th, and 13th Naval Districts.

Letters to the Editor

The following queries from Reservists, received by the Editor of The Naval Reservist, were answered in the September 1960 issue of that publication. Because the questions are of particular concern to all Reservists, the answers are repeated for the information of all Medical Department Reserves.

Contingency Option Act. ". . . The Uniformed Services Contingency Option Act . . . has caused lively discussions in my unit. Some members contend that once a Reservist chooses one of the options for survivors' benefits, the Government will pay that option to survivors even if the Reservist does not live until age 60 after having attained 20 years of satisfactory Federal service. Others believe that no benefits would accrue to the survivor in such an instance. Could you clarify this point for us?" J.A.M.

When a Reservist has made an election for benefits under the Uniformed Services Contingency Option Act, the deduction in his retirement pay becomes effective on the date of his retirement with pay. The reduction in his retirement pay will be computed on the basis of appropriate percentage cost tables effective on the date of transfer to a retired pay status.

No annuity is payable to beneficiaries unless the member has been awarded retirement pay, no deductions will have been made; therefore, no annuity can be paid.

The Case of the Missing Point. "Two years ago, through an oversight, I accumulated only 49 of the required 50 points toward the completion of a year of satisfactory Federal service for retirement purposes. Inasmuch as these points were obtained through correspondence courses, is there any way I can earn the one needed point at this late date?" W.B.S.

Sorry. All points must be earned during the anniversary year. Points in excess of the required 50 may not be carried over to the following year, nor may delinquent points be added retroactively. Therefore, it is not possible for you to receive credit for a year of satisfactory Federal service for the year in which you earned 49 points. Those 49 points are not lost to you, however, because they will be used in the final computation of your retirement points.

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NOTICE: Eligible inactive Naval Reserve Medical Department officers may receive one retirement point credit for each day's attandance at the Annual Convention of the Association of Military Surgeons, Mayflower Hotel, Washington, D. C., 31 October, 1 - 2 November 1960, provided they register with the military representative present. Detailed announcement of this convention appeared in the Medical News Letter, 9 September 1960.

American Board Certifications - Inactive Reserve

American Board of Abdominal Surgery
CDR William F. Schroeder

American Board of Internal Medicine
LT Eugene G. Boss Jr.

American Board of Obstetrics and Gynecology
LTJG Paul R. Kearnes, LT Joseph C. Leshock

American Board of Pathology
LT Hugh R. Dudley

American Board of Pediatrics
LTJG James A. Whiteside

American Board of Radiology
LCDR John C. O'Leary

American Board of Surgery
LT Paul F. Grice, LT Louis Kurahara, LT Robert M. Vetto

American Board of Surgery and Board of Thoracic Surgery
LT Walter S. Henly

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OCCUPATIONAL MEDICINE

Value of Ear Defenders

Ear defenders were worn for protection against the distracting effects of bursts of loud, but not unacceptable, noise during a mental task. Two types of noise were used: one characterized by high and the other by low frequencies. Performance was better with defenders than without them. The improvement was particularly marked with the high-frequency burst. (M. M. Woodhead, Value of Ear Defenders for Mental Work During Intermittent Noise: Industrial Hygiene Digest, August 1960)

Hearing Loss Related to Non-Steady Noise Exposures

Hearing loss related to noisy occupations has long been recognized as an entity having been first noted in millers by Ramazzini. Kryter notes that Fosbrooke speaks of "old" and "modern" discussants on the subject in 1831. The last two decades have shown an accelerating upsurge in interest in the occupational deafness problem.

Only recently, have attempts been made to relate hearing loss to industrial noise exposures in any quantitative way. These studies conducted by the American Standards Association, and Rosenwinkel and Stewart were limited to steady-state noises which could easily be described by sound level meter-octave band equipment.

Limitations of conventional noise measurement equipment led Stewart to design a completely new type of device which integrates sound energy over finite time periods. The principles and details of the design of this instrument were presented by Stewart to AIHA at the 1954 Industrial Health Conference held in Chicago in April of that year. This instrument integrates over a 5-second interval the logarithm of all of the noise between 300 and 5000 cycles per second above a 60 db threshold sensed through a weighted microphone.

The present study is a tentative exploration of the relationship which may exist between hearing loss and industrial noises measured with the Stewart noise dosimeter.

In order to secure a sample population of a size large enough to allow statistical analysis while still meeting the stated criteria for selection, it was necessary that a large industrial establishment be available. It was fortunate that a suitable plant gave its support to this project. This facility employs over 25,000 persons and the firm's policy of upgrading its employees from unskilled starting jobs to more skilled positions has brought about a rather unusual condition in which a majority of the employees have spent their entire industrial careers at this one plant. The plant consists of several large machine shops, several fabricating divisions for major sub-assemblies, final product assembly divisions, and a large foundry.

The test population was selected from the workers at seven different locations which encompassed a wide range of noise levels and provided the means for investigation into the existence of a dose-hearing loss relationship. Characteristics of the noise in most locations were such that meaningful sound level meter-octave band measurements were not possible.

The population exposed to these noises consisted of male employees of less than 35 years of age who had up to 10 years of exposure. Workers with exposures limited to only one type of noise were not available in this plant, therefore, a compromise criterion was adopted for subject selection which would allow exposure to other noises for not more than 20% of an industrial

career. This 20% exposure, furthermore, must have been to noises which were judged to be no more severe than the present environment. Workers whose audiograms indicated a severe conductive hearing loss were eliminated from the study.

The test environment and audiometric techniques employed in this survey approached the best clinical practices. For a detailed description of these procedures, reference is made to the published report of an earlier investigation by the authors (The Relationship of Hearing to Steady State Noise Exposure, a Report of an Industrial Survey: American Industrial Hygiene Association Quarterly, September 1957).

The study demanded a quantitative measurement of the noise and the environment to serve as the basis for a relative noise dose rate from which the cumulative noise doses for each test subject could be calculated. A sampling technique randomized within certain strata was devised as the best means of arriving at such a measurement. For practical reasons, the period of a week was selected as a major subdivision of time over which sampling was to be performed. In order to account for possible temporal variations in the noise level at the seven sampling locations, the week was divided into halves and the days into thirds. It seemed likely that the pace of production (and the amount of noise generated) might undergo cyclical changes during the day and week and that such variations must be recognized in computing relative noise dose rates for each of the seven locations from which the test population was drawn. Thus, the final plan was to divide the week into six cells (the week into halves and the work days into thirds) with each of the seven locations to be sampled once in each cell, thereby giving a total of 42 environmental samples each week, six for each location.

The individual samples consisted of 120 5-second integrations of the noise dose meter for a total sampling time of 10 minutes. The specific point at which a sample was to be obtained at each location was selected by a random choice of an individual out of all the workers included in the study at this location. The order in which the locations were sampled was also randomized within each of the six cells in a week. The technique of actually obtaining the readings which constitute the environmental sample was quite simple once the actual spot for sampling was chosen.

The meter itself is easily carried and simple to operate. The problems of microphone position, meter range, selection, and so forth are no different from those encountered in most sound measuring instruments.

During sampling the calibration of the instrument was maintained to give a reading of 80 units when placed in a sound field of 80 db re 0.0002 dynes/cm at 1000 cycles per second.

The means of the meter readings are actually logarithmic functions since the noise dose meter at one state in its computer circuitry takes the common logarithm of the noise function sensed by the weighted microphone. It is necessary for the instrument to take the common logarithm of the noise

function in order to reduce the range of the summations of the noise energy to a manageable size dictated by components of the electronic circuit. To restore the dose readings to their proper relationships, the antilogarithms of the meter readings were needed. Again, to keep the numbers thus obtained down to practical size, the mean meter readings were first divided by 100 before the antilogarithm was taken. The authors have named this quantity the relative noise dose rate.

To calculate the estimated cumulative noise dose, the antilogarithm obtained for any location was multiplied by the number of months of exposure for all individuals within that location. For example, a pneumatic chipper working in location #6 for 100 months where the relative noise dose rate is 11.65 would have a calculated cumulative noise dose of 1165 dose units.

No specific physical definition of the dose unit is tendered at this time. The particular range of values in this study from 81 to just over 1400, evolved from the manner in which the instrument was calibrated, the derivation of the relative noise dose rate, and the length of exposures of the test subjects included in the survey. Thus, the range used expresses only the relative insult on hearing, weighted by the severity and length of exposure and not a quantitative measurement of noise energy delivered over the time of the study.

In the analysis of these data, the object has been to describe statistically the relationship which exists between the observed hearing loss in a test group and the calculated cumulative noise dose of the individuals who make up that group. This analysis is based on an assumed linear relationship between the variables of the hearing loss and the cumulative noise dose. To describe this relationship it is necessary to determine the regression coefficient of a line which best fits the data obtained. In addition to this, a correlation coefficient is calculated to describe the intensity of the relationship which exists between the two variables. The statistical significance of the numerical value of a slope may be determined by the value of t which is derived for that slope if one applies the assumption that the true slope is zero. The numerical values of the regression coefficient, the correlation coefficient, the variance of the hearing losses about the mean regression line and the values of t obtained for each audiometric test frequently yield evidence of a significant relationship between hearing loss and calculated cumulative noise dose. If the assumption of no linear relationship between the two variables is tested, the probability of obtaining the values of b and r as a matter of chance for the four frequencies considered would be less than 5 in 100. The significant values for t and r at the 95% levels of confidence, for the number of observations in this analysis, are approximately 1.98 and 0.21, respectively.

Considering the individual audiometric test frequencies, it can be seen that the values of b and r are at or near a maximum for 4000 cycles per second. Since it is generally agreed that the ear is most susceptible to acoustic trauma at 4000 cycles per second, this supporting evidence of the steepest

slope and strongest association between the variables is suggestive that the calculated cumulative noise dose derived from measurements with the Stewart noise dose meter explains a part of the hearing loss as measured in this survey. In addition to the values of b and r, it is noted that the value of t is greatest for 4000 cycles.

Characterization of the three variables, hearing loss, relative noise dose rate, and time of exposure indicates that both the rate of dosage and the time of exposure are probably of equal importance in explaining the observed hearing losses. The losses observed are the result of some complex function of time, rate, and the interaction of the two rather than a simple product such as is assumed in this study. The shape of the hearing loss surface provides an indication of the nature of this function.

A disappointing result of this analysis is that the relationship between observed hearing loss and calculated cumulative noise dose is not more intense. Some causes of this weakness are inherent in factors which contribute to the variance of hearing loss about the mean regression line. Among these are the following: (a) hearing acuity as such is a biological attribute which is subject to variation among individuals and is thus distributed about a mean value even for persons of like characteristics; (b) susceptibility to acoustic trauma is subject to variation among individuals; (c) some of the observed hearing loss is due to factors not accounted for in the calculated cumulative noise dose, such as unrecognized ear pathology, non-occupational or military noise exposures, noise exposure on jobs other than the present one, and so forth; (d) inherent errors in the technique of measuring hearing loss.

Conclusions. (1) A significant linear relationship exists between observed hearing losses in the test population and a calculated cumulative noise dose derived from environmental noise measurements conducted with the Stewart noise dose meter. This relationship exists at all frequencies of 2000 cps and over, but is most intense at 4000 cps, the frequency most susceptible to acoustic trauma.

(2) The described relationship cannot be used as an estimator of hearing loss for individuals exposed to noise due to the wide variance of observed hearing losses about the mean.

(3) The intensities of the relationship between observed hearing loss and each of the two factors, time of exposure and relative noise dose rate, are about equal.

(4) The present data are inadequate to describe the precise relationship between observed hearing losses and exposure to noise.

Summary. This study was a first investigation into the possible existence of a relationship between noise as measured with an integrating type meter and hearing loss. The noise to which the persons were exposed was widely fluctuating and not sensibly measurable with the conventional types of noise measuring equipment. As a first approximation, the existence of the

relationship has been investigated on a linear basis. The relationship describes the distribution of hearing loss in a population and must not be applied as a predictor of hearing loss individuals. The true nature of the relationship between hearing loss and noise exposure cannot be discerned from these data; however, it appears to be some function of time, rate, and an interaction between the two. (LCDR N. E. Rosenwinkel MC USN,* and K. C. Stewart, Hearing Loss Related to Non-Steady Noise Exposures: Amer Industr Hyg Assn J, 20: 290-293, August 1959)

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Anterior Dislocation of the Shoulder

Patient, M. O., a 30-year old physician, experienced acute pain in the left shoulder after falling on his outstretched left hand. He presented himself to the emergency ward with the clinical diagnosis of anterior dislocation of the shoulder.

Physical Examination. The patient was supporting his elbow with the opposite hand. The acromion on the left side was prominent with flattening of the deltoid muscle. Palpation showed the head to be in the subcoracoid area. When he attempted to touch his right shoulder with his left hand, the elbow would not fall against his body (Dugas' test). The nerve and vascular supply to the left upper extremity were intact.

Laboratory Data. Roentgenograms demonstrated an anterior dislocation of the head of the left humerus.

Early Management. The patient was given 100 mg of meperidine IM and placed in a prone position upon a cart, with the left upper extremity hanging over the edge. A sandbag was placed under the left clavicle. Ten pounds of weights were attached to his forearm by skin traction. The room was darkened and he was left alone for 30 minutes. Gentle external rotation and circumduction at this point allowed the humerus to relocate.

The extremity was then incorporated in a double sling or Velpeau dressing. He was instructed to maintain the dressing for 3 weeks. Abduction and external rotation were strictly forbidden during this period.

Comments. Dislocation of the shoulder seldom occurs in children. Among young adults, it most frequently occurs in athletes and epileptics. The anterior dislocation typically occurs in the person over 30 years of age who falls upon the outstretched hand and abducted arm. In a recent study, anterior dislocation was approximately 100 times more common than posterior dislocation.

It should be noted that roentgenograms often provide little help in differentiating between the anterior and posterior dislocation. Therefore, the examiner should first attempt to palpate the head of the humerus. If this is

impossible, the head can be located by projecting a perpendicular line anterior to a line between the humeral condyles. The humeral head will project upon this line. However, roentgenograms should always be taken prior to reduction in order to rule out associated fractures, confirm the diagnosis, provide a permanent record, and for medicolegal reasons.

Early reduction will cause less pain and, therefore, less resistance. Neurologic complications and vascular difficulties also increase with the passage of time prior to reduction.

The method of reduction should be simple and atraumatic and should not require a general anesthesia. The Kocher method (flexion of the elbow with caudal traction and external rotation of the arm) has been known to cause spiral fractures of the humerus, and frequently requires a general anesthetic. Hippocrates described a method in which the surgeon removes his shoe and places his foot against the lateral chest wall. This applies direct traction to the upper extremity. Frequently, the foot is used as a lever to abduct the proximal humerus. If too much pressure is applied to the axilla, it can cause a brachial plexus palsy.

At the University Hospital in Columbus, Ohio, a modified Stimson maneuver has been used. Reduction has occurred in more than 75% of the dislocated shoulders without use of general anesthesia. To date, there have been no complications in approximately 150 cases. In those cases which do not relocate after gentle external rotation and pendulum motion, one of the other methods of reduction previously described is used.

If the dislocated shoulder is reduced, the hand can easily be placed upon the opposite shoulder, with the elbow touching the chest.

Following reduction of the patient's first dislocation by any method, the shoulder is immobilized for at least 3 weeks in a sling. The arm is maintained at the side by an additional rigid (nonadhesive) dressing around the arm and chest. This period of immobilization greatly diminishes the incidence of recurrent dislocation.

After the dressing is removed, the patient is instructed in circumduction exercises which are to be done for 5 minutes of every wakeful hour. This is one assurance against adhesive pericapsulitis and a stiff shoulder. (R. F. Slager, Anterior Dislocation of the Shoulder: Amer J Surg, 99: 964-965, June 1960)

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Understanding the Electron

Last year in the United States, about 1000 persons met death by accidental electrocution; another 5000 received serious injury from electrical causes. Property damage ran into millions.

Electron flow or movement along a conductor is called an electric current. A rate of 6×10^{18} electrons per second is equivalent to one ampere.

When current flows, it releases energy. An electrical current of only 25/1000 ampere passing through the human body can be lethal. Fortunately, it usually requires considerably more, especially when the current path does not cross the heart or important nerve centers. Even though not lethal, serious burns can result where higher currents are involved.

Three conditions are essential for sufficient current to pass through the human body to be dangerous. First, the circuit has to be complete. The current must have points of contact where it can enter and leave the body. The second condition is that the voltage must be high enough to cause a large enough current to flow. Finally, the source must have the capacity to supply the current, whatever the voltage.

The most common situation which can provide the three necessary conditions for serious shock is contact with an ungrounded portable device, such as a hotplate, a stirrer, or a pH meter. These devices often develop an electrical path between the internal wiring and the frame. If this path is a a metallic one, it's called a short; if it's due to dirt or a breakdown of insulation, it's called a leak. In either case, the frame of the device would be hot electrically to ground. This hazard can be almost completely eliminated by the use of a 3-wire receptacle, plug, and cable. Heating tapes with thin porous insulation represent a class of potentially hazardous devices which cannot be easily made safe. Leakage sometimes exists from the heating wire in the tape through the insulation to the surface. It can be due to the insulation being worn thin or to some conducting material having soaked into it. There is no metal frame to ground, so a third wire is of no value. Other precautions to be observed in handling electrical equipment in the laboratory are discussed by the author. (J.G. Huffman, Understanding the Electron: Industrial Hygiene Digest, August 1960)

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Accident Facts

Accidental deaths reported in the United States in 1959 were up 400 from the 1958 total of 91,000. Increases in work and motor vehicle deaths were partially offset by a decrease in home accident deaths. The 1959 death rate of 51.6 per 100,000 persons was the lowest on record. Disabling injuries amounted to 1,950,000. The accidents in which the deaths and injuries occurred together with non-injury motor vehicle accidents, work accidents, and fires, cost the nation in 1959 at least $13,000,000. Accidental work deaths in 1959 totaled about 13,800—an increase of 500 over the 1958 total. Disabling work injuries totaled 1,950,000—a rise of 150,000 from the revised 1958 total. Contributing to the increases was an increase in total hours worked; employment rose about 2% and average hours worked per week were up nearly 1%.

Since the end of the war, accidental deaths of workers on the job have decreased 16%. Off the job deaths show very little change, and for most years

actually total more than at the end of the war. The ratio of off-job to on-job deaths increased from 1.82 in 1945 to a high of 2.23 in 1957. In recent years, this ratio has been decreasing as off-job programs gain support.

While deaths have decreased less off the job than on the job, the reverse is true for injuries. Since 1945, on-job injuries have decreased only 3% compared with an 18% decrease for injuries off the job. Handling objects is the principal source of compensable work injuries. Falls cause the next largest number, with falling objects and machinery accidents the third and fourth sources. Fatal injuries arise principally out of vehicle accidents, while injuries of temporary disability arise principally out of handling accidents. Among reporting states, the average wage compensation paid in all work injury cases was about $775. Fatalities averaged nearly $13,800; permanent partial disabilities over $1,200. Other interesting sections in this booklet present statistics on motor vehicle accidents and on accidents on the farm, in the home, and at school. (National Safety Council, Accident Facts, 1960 Edition)

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Mercury Poisoning

An investigation was made by the Industrial Hygiene Division of the Medical Department, U. S. Naval Shipyard, Mare Island, to determine the habitability status of the house in which an accidental mishandling of mercury had resulted in acute poisoning of a family of six.

The incident occurred when two enlisted Navy men returned from a gold panning trip, and one of the individuals separated a gold amalgam by boiling off the mercury from a pan over a burner on his kitchen stove. The entire family became ill. Thirty-six hours later, the youngest child, an infant of 9 months, died after a brief hospitalization.

The principal residual mercury contamination in the house was found in the kitchen, washing machine, and soiled clothes hamper.

The Industrial Hygiene Division recommended that:

1. The washing machine be removed and dismantled for cleaning (removal or inactivation of mercury).
2. The soiled clothing be removed and cleaned.
3. The silver foil used to cover the stove fuel be removed and replaced.
4. A calcium polysulfide be used to clean contaminated floor area. This cleaning to be followed by the application of a wax containing a wettable sulfur, thus inactivating the residual mercury.

(Quarterly Occupational Health Report, U. S. Naval Shipyard, Mare Island, Vallejo, Calif., April - June 1960)

Neurologic Manifestations of Chronic Carbon Monoxide Poisoning

A case report from the Section of Neurology at Yale University illustrates the symptomatology and diagnostic difficulties of this insidious and controversial disease. A policeman aged 50 was found during his second admission to a hospital to have been exposed to two common sources of carbon monoxide; duty in heavy traffic and in a badly ventilated garage where police car radios were often charged by gasoline driven generators. Afterwards, a third source was a gasoline driven farm tractor with the exhaust at head level.

During the first admission, the diagnosis was psychomotor seizures and cerebral atrophy, possibly related to an old head injury. Treatment with anticonvulsant drugs which he had had for 2 years was continued. He returned to work improved in health, but was readmitted 6 months later.

The occupational history was investigated. Chronic carbon monoxide poisoning was verified by finding the blood to be 20% saturated with carbon monoxide 30 hours after ceasing work. Treatment was stopped. He remained essentially asymptomatic except during the tractor episode. The symptoms which had begun 4 years before during traffic duty were anorexia, weight loss, a fluctuating organic mental syndrome and recurrent episodes of unconsciousness; each attack was preceded by dizziness and ataxia, and usually occurred in the afternoon.

Hyperthyroidism, suggested by sweating and fine tremor, was excluded by normal metabolic tests, hypothyroid range of blood iodine, and normal radioactive iodine uptake. There was transient albuminuria. Serum glutamic oxalacetic transaminase was slightly elevated. Serial electroencephalograms after withdrawal from exposure showed progressive clearing of focal and paroxysmal abnormalities, correlated with clinical improvement. (G. J. Gilbert, G. H. Glaser, Neurological Manifestations of Chronic Carbon Monoxide Poisoning: Industrial Hygiene Digest, August 1960)

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Microwave Radiation Hazards

The author offers the following suggestions for control of possible radiation hazards:

1. Avoid any exposure to radio-frequency energy having a power density of 0.01 watts per cm^2 or greater. Areas accessible to transit personnel and having a power density equal to, or greater than, 0.01 watts per cm^2 should be posted with a caution sign and flashing light, and should not be occupied for any length of time.

2. Do not make detailed visual examination of any microwave radiator, reflector, wave guide horn, or magnetron during periods of transmission.

3. Limit the number of personnel having access to areas immediately adjacent to test stands or benches containing equipment radiating energy of hazardous power. Only those required to perform specific tests should be present.

4. Use dummy loads, water loads, or other absorbent materials when possible to absorb the energy output of the transmitter while being operated or tested.

5. When suggestion No. 4 cannot be complied with, provide absorbent screening to isolate test stands from each other or from adjacent administrative areas which may be affected by the microwave radiation. It is believed that repeated exposure to radar waves while observing proper precaution does not lead to any cumulative or chronic effects on the body. This seems to be proven by the lack of evidence showing that anyone has been seriously injured from working with radar equipment. There have been some reports in the past concerning alleged injuries, but it is the opinion of most medical scientists that the reported disorders were not caused by radar.

(W. E. Morgan, Microwave Radiation Hazards: Industrial Hygiene Digest, August 1960)

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